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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/427,457	10/16/1999	GEOFF P. ANDERSEN	AFB00497	3207

7590 09/09/2002

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EXAMINER

CHANG, AUDREY Y

ART UNIT	PAPER NUMBER
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2872

DATE MAILED: 09/09/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

ATC

**Office Action Summary**

Application N .

09/427,457

Applicant(s)

ANDERSEN, GEOFF P.

Examiner

Audrey Y. Chang

Art Unit

2872

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 19 June 2002.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-8, 12-26 and 29-39 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-8, 12-26 and 29-39 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

## DETAILED ACTION

### *Continued Examination Under 37 CFR 1.114*

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on *June 19, 2002* has been entered.
2. This Office Action is also in response to applicant's amendment filed on June 19, 2002, which has been entered as paper number 17.
3. By this amendment, the applicant has amended claims 1, 16 and 33.
4. Claims 1-8, 12-26, 29-39 remain pending in this application.

### *Drawings*

- ✓ 5. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the holographic microscope and holographic image corrector comprises a microscope recited in *claims 1, 2, 19 and 21* must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

### *Response to Amendment*

- ✗ 6. The amendment filed on *June 19, 2002* is objected to under 35 U.S.C. 132 because it introduces **new matter** into the disclosure. 35 U.S.C. 132 states that no amendment shall introduce new matter into the disclosure of the invention. The added material which is not supported by the original disclosure is as

Art Unit: 2872

follows: claim 1 has been amended to recited a "holographic microscope". The specification does not give a support for a holographic microscope.

Applicant is required to cancel the new matter in the reply to this Office Action.

7. The amendment filed on *December 31, 2001* is objected to under 35 U.S.C. 132 because it introduces **new matter** into the disclosure. 35 U.S.C. 132 states that no amendment shall introduce new matter into the disclosure of the invention. The added material which is not supported by the original disclosure is as follows: claims 2 and 19 and 21 **have been amended** to include the phrase "**a holographic image corrector comprising a microscope**". The specification only gives support for the holographic image corrector to be **employed in** a microscope but does not give support for the corrector to comprise a microscope. The specification discloses that the holographic corrector is a **single optical plate** (such as 41 in Figures 3 and 4) that is *impossible* to comprise a microscope, which is a complicate optical system. The applicant is respectfully reminded that an element employed within a system will not be able to comprise that system, for such is not logical.

Applicant is required to cancel the new matter in the reply to this Office Action.

*Claim Rejections - 35 USC § 112*

8. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

9. Claims 1, 2-8, 12-14, 15-17, 18, 21-26, 29-31, 32-36 and 37 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which *was not described in the specification* in such a

Art Unit: 2872

way as to *enable* one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

The specification fails to teach how could the image of an article be corrected by illuminating the article and transmits the light bearing article information through the objective and then through the hologram of the objective. It is known in the art, as demonstrated in the teachings of "Optical Holography" by Hariharan, ( page 177-179 reference *has been* provided in the previous Office Action dated March 4, 2002), the wavefront (from an object such as the pinhole) passes through a distortion medium, which can by any optical system such as an objective, will be distorted. The distortion medium imparts *phase distortion* to make the object wavefront a *distorted* wavefront. The *distorted* wavefront is then recorded as a hologram in a recording medium. In order to obtain a non-distorted wavefront for the object, the object is illuminated in the backward sense such that a *conjugated* reconstructing light is shined from the opposite direction through the hologram first, which reconstructs the *conjugate* of the distorted wavefront. The conjugate of the distorted wavefront then passes through the distortion medium such that the conjugate of the distortion wavefront is canceled by the distortion of the medium to obtain an undistorted wavefront, (i.e. a phase cancellation is resulted).

The image correction means and method disclosed in the *specification of the instant application* will not be able to provide image correction since by making the light *from* the *article* to pass the objective the objective will make the light with the article information *distorted*. The distorted light beam then passes through the hologram which will be *further imparted* with the *recorded distortion* of the objective to make the distorted light beam *even more distorted*. The *phase relationship* is not correct to make the distortion recorded in the hologram to cancel the distortion caused by the objective. *The applicant is respectfully requested to explain why by adding up all these distortion the image will be corrected.* The applicant is respectfully reminded that none of the object beam used to reconstruct the hologram and the reconstructed reference beam is *conjugate* to the original object beam or reference

Art Unit: 2872

beam this arrangement will not be able to provide distortion phase cancellation therefore no image correction.

The specification also fails to teach that how could an *additional interference* pattern being formed by illuminating the hologram with the reference beam, as recited in claim 36. The reference beam will just reconstruct the original object beam, which in this case is just the image of the pinhole and will not form an additional interference pattern.

✓ 10. Claims 1, 2-8, 12-14, 19, 21-26, 29-31 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

The reasons for rejection based on *newly added matters* are set forth in the paragraphs above.

11. Claims 1, 2-8, 12-14, 19, 21-26 and 29-31 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to *enable* one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

Claims 2, 19 and 21 have been amended to include the phrase “a holographic image corrector comprising a microscope”. The specification fails to teach how could a holographic image corrector which is simply a single optical plate is capable of comprising a microscope, which is a complicated optical system having more than one optical components. Claims 3-8, 12-14, 22-26, and 29-31 inherit the rejection from their respective based claim.

The specification also fails to teach how could the image corrector is capable of “providing an accurate image in a recording medium” as recited in claims 18 and 37. The image correction is never

Art Unit: 2872

meant for providing a correct image in a recording medium rather the recording medium is used to record the distortion of the objective.

12. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

✓ 13. Claims 12, 18 and 37 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The reasons for rejection have been set forth in the *previous Office Action dated July 19, 2001*, in *paragraphs 3 and 5* under the title for 35 USC 112, second paragraph. They are repeated as follows.

✕ The phrase "said pinhole is replaced by a first spatial filter" recited in claim 12 appears to be vague and indefinite since it is not clear if the pinhole is replaced by an **article**, as claimed in its base claim (claim 2), or is replaced by a **first spatial filter**. The scope of the claim is therefore indefinite.

The phrase "the article" recited in claims 18 and 37 appears to be vague and indefinite since it lacks proper antecedent basis from earlier part of the claim.

### *Claim Rejections - 35 USC § 103*

14. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.



Art Unit: 2872

15. Claims 1, 2, 8, 12-14, 15-17, 18, 19, 20, 21-26, 29-31, 32-36, 37, 39 and 39 are rejected under 35 U.S.C. 103(a) as being unpatentable over the article "Window aberration correction in laser velocimetry using multifaceted holographic optical elements" by Schock et al, Applied Optics Vol. 23, No. 5, pages 752-756, in view of the patent issued to Friedl (PN. 3,598,466).

Schock et al teaches a holographic optical element that is capable of *correcting* aberrations of an optical element wherein the *holographic optical element* is formed by generating a *coherent light beam* from a *laser light source*, passing the coherent beam through a beam splitter to split the beam into a *first* and a *second coherent beams*, and then passing the first coherent beam through a *first pinhole plate* and an optical system, having the aberrations desired to be corrected, to form an *object beam* and passing the *second coherent beam* through a *second pinhole plate* and a *collimating lens* to form *collimated reference beam* and directing the object beam and the reference beam to a *holographic recording film* to form the hologram, (please see Figures 6 and 7, pages 754-755).

This reference has met all the limitations of the claims with exception that it does not teach explicitly that the optical system that is intended to be corrected includes an objective. *Friedl* in the same field of endeavor teaches explicitly a process for the holographic correction of aberrations in an optical system wherein the optical system may include a lens that is in place of a transparent object to be holographically recorded, (please see column 1 lines 6-16). It would then have been obvious modification to one skilled in the art to combine the teachings of Schock et al and Friedl to record a hologram in essentially the same manner as disclosed by Schock et al with an *objective lens* as the optical system to be corrected for the benefit of providing a hologram that is capable of correcting aberrations of an objective lens. Schock et al teaches that a reconstructed object wave, which is an aberrated diffraction wave, may be reproduced by illuminating the holographic optical element with the reference beam, (please see Figure 7 and columns 1-2 of page 755). Schock et al demonstrated to reconstruct the object wave in an opposite direction such that the reconstructed object wave passes through the optical system

Art Unit: 2872

wherein the aberrations in the object wave are *canceled* by the optical system. Schock et al teaches that the corrected object wave is then be able to focus at a common focal area which is at position of the pinhole plate in the recording process, (please see Figures 6 and 7). Schock et al however does not teach explicitly that an article replaces the pinhole plate such that a corrected image of the article may to be viewed. However such modification is considered to be obvious to one skilled in the art as intended application. Since the reconstruct light disclosed by Schock et al may be utilized to illuminate an article for viewing such article. Friedl also teaches that the hologram obtained by using an optical system such as lens as a transparent object may be used with the optical system to obtain corrected image of an object, (please see column 1 lines 15-17 and 3-4 and Figure 1). It would then have been obvious to one skilled in the art to modify the arrangement disclosed by Schock et al to place an article at the focal area or the position of the pinhole to illuminate the object and to use the hologram as the corrector to obtain a corrected image of an article.

Claim 1 has been amended to claim a "holographic microscope" and Claims 2, 15, 18, 21, 32, and 37-39 include the feature concerning "microscope". However these features have *not given patentable weight* because it has been held that a *preamble* is denied the effect of a limitation wherein the claim is drawn to a structure and the portion of the claim following the preamble is a self-contained description of the structure not depending for completeness upon the introductory clause. *Kropa v. Robie*, 88 USPQ 478 (CCPA 1951). In this case the claims following the preamble each contains a self-contained description of the structure for making a hologram using an objective that does not depend on the "microscope" to be complete.

With regard to the feature concerning "a corrector hologram maker comprises a microscope" and the feature "a holographic image corrector comprises a microscope", they are rejected under 35 USC 112, first paragraph, for reasons stated above. These features concerning the holographic optical element being used in a microscope are also considered to be obvious modifications to one skilled in the art for it

Art Unit: 2872

has been held that a recitation with respect to the manner in which a claimed apparatus *is intended to be employed does not* differentiate the claimed apparatus from a prior art apparatus satisfying the claimed structural limitations. Ex parte Madham, 2 USPQ2d 1647 (1987).

With regard to the features concerning the optical system may also be a concave mirror and being tilted to an off-axis position, although these references do not teach such features explicitly however since concave mirror is a common type of optical system and the specification fails to teach the criticality of having this particular arrangement would overcome any problem in prior art such features are therefore being considered as obvious matter of design choices.

With regard to the features concerning the sizes of the systems, these references do not teach such features explicitly however they are either inherently met by the arrangements of the cited references or an obvious modifications to one skilled in the art since a change in size is generally recognized as being within the level of ordinary skill in the art. In re Rose, 105 USPQ 237 (CCPA 1955).

With regard to the features concerning the pinhole plates used being an array of pinholes, these references do not teach such features explicitly however such modifications would have been an obvious matter of design choice to one having ordinary skill in the art since it is known in the art to use a pinhole plate or a pinhole array to provide spatial filtering to the light beam for the purpose of regulate the light beam profile.

With regard to claim 36, the feature recited is rejected under 35 USC 112, first paragraph, for the reasons stated above. It cannot be further addressed here since the feature is not enabled by the disclosure.

*Response to Arguments*

16. Applicant's arguments filed on June 19, 2002 have been fully considered but they are not persuasive. The newly amended claims have been fully addressed and they are rejected for the reasons stated above.

17. Applicant's arguments are based on *wrong* operation principle of the image corrector they are therefore not persuasive to overcome the rejections. The applicant is respectfully reminded that the fundamental principle of the holographic image corrector is to record the *distortion* of an optical element in a hologram and then reconstruct the hologram so that a *conjugate* distortion will be created in the optical system to *counteract* the actual distortion of the optical element. The *specification* and the claims fail to disclose such principle, which therefore fails to provide an enabled apparatus to achieve the intended image correction.

18. The applicant is also respectfully reminded that the idea using hologram to correct aberrated wavefront is *standard* knowledge in the art, as demonstrated in any holography textbook. The examiner has provided a reference Optical Holography by Hariharan (particular page 178-179) to demonstrate the basic principle in the previous Office Action.

19. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Audrey Y. Chang whose telephone number is 703-305-6208. The examiner can normally be reached on Monday-Friday (8:00-4:30), alternative Mondays off.

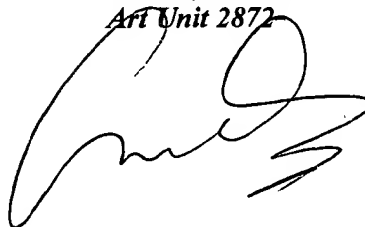
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Cassandra Spyrou can be reached on 703-308-1637. The fax phone numbers for the organization where this application or proceeding is assigned are 703-308-7722 for regular communications and 703-308-7722 for After Final communications.

Art Unit: 2872

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

*Audrey Y. Chang*  
*Primary Examiner*  
*Art Unit 2872*

A. Chang, Ph.D.  
September 6, 2002

A handwritten signature in black ink, appearing to be 'Audrey Y. Chang', written over the printed name and title.